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Test 1201: Ford 5600 Diesel 8-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1201 – FORD 5600 DIESEL – 8 SPEED

POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Temperature Degrees F Air wet bulb	Air dry bulb	Barometer inches of Mercury
Rated Engine Speed—Two Hours (PTO Speed—597 rpm)								
60.46	2100	3.878	0.445	15.59	185	54	75	29.163
Standard Power Take-off Speed (540 rpm)—One Hour								
56.85	1900	3.604	0.440	15.77	188	54	75	29.165
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
54.44	2225	3.573	0.455	15.24	174	54	75	.....
0.00	2339	1.120	.....	.....	152	54	75	.....
27.86	2278	2.279	0.567	12.22	166	55	75	.....
60.89	2100	3.940	0.449	15.45	184	54	74	.....
14.13	2310	1.678	0.824	8.42	163	54	75	.....
41.26	2250	2.885	0.485	14.30	169	55	76	.....
Av 33.10	2250	2.579	0.541	12.83	168	54	75	29.135

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool-ing med	Air wet bulb	Air dry bulb	Barometer inches of Mercury
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VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours 4th Gear											
50.09	4150	4.53	2098	7.50	3.893	0.539	12.87	190	55	73	28.640
75% of Pull at Maximum Power—Ten Hours 4th Gear											
42.65	3229	4.95	2250	5.54	3.312	0.539	12.88	167	47	57	28.772
50% of Pull at Maximum Power—Two Hours 4th Gear											
30.38	2217	5.14	2288	3.65	2.757	0.630	11.02	165	51	54	28.550
50% of Pull at Reduced Engine Speed—Two Hours 5th Gear											
30.27	2204	5.15	1913	3.65	2.307	0.529	13.12	165	56	58	28.495

MAXIMUM POWER WITH BALLAST

35.61	7105	1.88	2249	14.35	2nd Gear			170	65	77	28.350
49.74	5826	3.20	2101	11.06	3rd Gear			190	53	72	28.690
52.15	4311	4.54	2104	7.50	4th Gear			186	53	70	28.720
52.22	3567	5.49	2099	6.28	5th Gear			189	53	72	28.690
51.93	2797	6.96	2101	4.81	6th Gear			188	53	72	28.690
47.03	1413	12.48	2104	2.53	7th Gear			180	53	72	28.690

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 4th Gear

Pounds Pull	4311	4519	4641	4731	4782	4682
Horsepower	52.15	48.71	44.75	39.65	34.72	28.62
Crankshaft Speed rpm	2104	1883	1689	1472	1275	1073
Miles Per Hour	4.54	4.04	3.62	3.14	2.72	2.29
Slip of Drivers %	7.50	7.89	8.14	8.39	8.39	8.39

TRACTOR SOUND LEVEL WITHOUT CAB

	dB(A)
Maximum Available Power 2 Hours	96.0
75% of Pull at Max. Power 10 Hours	96.5
50% of Pull at Max. Power 2 Hours	96.5
50% of Pull at Reduced Engine Speed 2 Hours	92.5
Bystander (in 8th gear)	88.5

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires	Two 18.4-30; 6; 16	Two 18.4-30; 6; 16
Ballast	1160 lb each	None
	528 lb each	None
Front Tires	Two 7.50-16; 6; 32	Two 7.50-16; 6; 32
Ballast	120 lb each	None
	85 lb each	None
Height of drawbar	22.5 inches	22.5 inches
Static weight with operator—rear	7350 lb	3975 lb
front	2340 lb	1930 lb
total	9690 lb	5905 lb

Department of Agricultural Engineering

Dates of Test: March 15 to 29, 1976

Manufacturer: FORD MOTOR COMPANY,
Tractor Operations, 2500 East Maple Road,
Troy, Michigan 48084

FUEL, OIL AND TIME Fuel Premier Diesel Cetane No 51.7 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8330 Weight per gallon 6.936 lb Oil SAE 30 API service classification SB/SE CA/CD To motor 1.933 gal Drained from motor 1.734 gal Transmission and final drive lubricant Ford M2C53A Total time engine was operated 51.5 hours.

ENGINE Make Ford Type 4 cylinder diesel Serial No *L010047* Crankshaft mounted lengthwise Rated rpm 2100 Bore and stroke 4.2" x 4.2" Compression ratio 16.3 to 1 Displacement 233 cu in Cranking system 12 volt Lubrication pressure Air cleaner oil washed wire mesh Oil filter full flow cotton blend spin-on cartridge Fuel filter nylon gauze in bottom of tank and paper element Muffler vertical Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No *C-483088* Tread width rear 56" to 80" front 52" to 80" Wheel base 87.5" Center of gravity (without operator or ballast, with minimum tread with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 27.3" Vertical distance above roadway 32.95" Horizontal distance from center of rear wheel tread 0.02" to the right Hydraulic control system direct engine drive Transmission selective gear fixed ratio Advertised speeds mph first 1.5 second 2.0 third 3.5 fourth 4.7 fifth 5.6 sixth 7.0 seventh 12.4 eighth 16.8 reverse 2.3 and 8.1 Clutch single plate dry disc operated by foot pedal Brakes oil cooled multiple disc mechanically operated by two foot pedals which can be locked together Steering power assist Turning radius (on concrete surface with brake applied) right 120" left 120" (on concrete surface without brake) right 138" left 138" Turning space diameter (on concrete surface with brake applied) right 252" left 252" (on concrete surface without brake) right 291" left 291" Belt pulley 1072 rpm at 2050 engine rpm diam. 11" face 6.5" Belt speed 3087 fpm Power take-off 540 rpm at 1900 engine rpm.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: Oil dripping from tractor mid-section was noticed after PTO runs. All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Temperature at injection pump return was 144°F. Six gears were chosen between 15% slip and 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1201.

LOUIS I. LEVITICUS
Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman
W. E. SPLINTER
D. E. LANE
Board of Tractor Test Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories may be disconnected only when the means for disconnecting can be reached from the operator station. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. Prior to the maximum power run the tire tread-bar height must be at least 65% of new tread height.

POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, $\frac{1}{2}$ of the 85% torque; maximum power, $\frac{1}{4}$ and $\frac{3}{4}$ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general use.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effects of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 4 different runs as follows: (1) as near to the pull at maximum power as

possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; (3) 50% of the pull at maximum power; and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 6 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe limit for the test course. The manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. The maximum safe speed for the Nebraska Test Course has been set at 15 mph. The slip limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Varying Drawbar Pull and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

SOUND MEASUREMENT

Sound is recorded during each of the Varying Power and Fuel Consumption runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet from the line of travel of the tractor.

An increase of 10 dB(A) will approximately double the loudness to the human ear.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska 68583.



FORD 5600 DIESEL—8 SPEED